



# HELI-BRIDLE®

PORTABLE SAFETY DEVICE  
PRODUCT MANUAL

## MULTI-AIRCRAFT CONFIGURATION

SHORT-HAUL ANCHOR AND  
RELEASE SYSTEM

ISO 9001:  
2008 CERTIFIED ✓



AGENCY:

UNIT:

SHOP:

PRODUCT SERIAL NUMBER:

DATE OF MANUFACTURE:

DATE IN SERVICE:

Heli-Bridle: \_\_\_\_\_

3 Ring Release: \_\_\_\_\_

Hook Extension: \_\_\_\_\_

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# AIR RESCUE SYSTEMS CORPORATION MULTI-AIRCRAFT CONFIGURATION HELI-BRIDLE® PSD PRODUCT MANUAL

## LIST OF EFFECTIVE PAGES

Original document date: 06-08-2015

Current revision: D (01-11-2016)

PAGE #	REVISION	DATE	PAGE #	REVISION	DATE
1	0	06-08-2015	23	1	01-11-2016
2	1	11-24-2015	24	0	06-08-2015
3	0	06-08-2015	25	0	06-08-2015
4	0	06-08-2015	26	0	06-08-2015
5	0	06-08-2015	27	0	06-08-2015
6	0	06-08-2015	28	0	06-08-2015
7	0	06-08-2015	29	0	06-08-2015
8	0	06-08-2015	30	0	06-08-2015
9	0	06-08-2015	31	0	06-08-2015
10	0	06-08-2015	32	0	06-08-2015
11	0	06-08-2015	33	0	06-08-2015
12	0	06-08-2015	34	1	12-17-2015
13	0	06-08-2015	35	1	12-17-2015
14	0	06-08-2015	36	1	12-17-2015
15	0	06-08-2015	37	1	12-17-2015
16	0	06-08-2015	38	0	06-08-2015
17	0	06-08-2015	39	0	06-08-2015
18	1	01-11-2016	40	0	06-08-2015
19	0	06-08-2015	41	0	06-08-2015
20	0	06-08-2015	42	0	06-08-2015
21	0	06-08-2015	43	1	07-14-2015
22	0	06-08-2015	44		

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To update this product manual with a revision remove and discard the outdated pages and replace with the provided updated revisions. Once complete remove this outdated effective pages sheet and replace with the provided updated sheet. All updated effective pages sheets will include a chronological list of all revisions to date.

## LIMITED WARRANTY -

Air Rescue Systems warrants for one year from the purchase date and only to the original retail buyer that our products are free from defects in material and workmanship. If the buyer discovers a warranty related defect, the buyer should return the product to Air Rescue Systems. Air Rescue Systems reserves the option to repair or replace any product returned under warranty. That is the extent of our liability under this warranty and, upon the expiration of the applicable warranty period, all such liability shall terminate.

## WARRANTY EXCLUSIONS -

Air Rescue Systems does not warrant products against normal wear and tear, unauthorized modification or alteration, improper use, improper maintenance, accident, misuse, negligence, damage, or if the product is used for a purpose for which it was not designed. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Except as expressly stated in this warranty, Air Rescue Systems shall not be liable for direct, indirect, incidental, or other types of damages arising out of, or resulting from the use of the product.

## WARNING -

Products manufactured by Air Rescue Systems are intended for use by professionals trained and experienced in the use, inspection, and maintenance of these products. Many products which Air Rescue Systems manufactures are used in helicopter operations which pose a very substantial risk of serious injury or death. You must read and understand all of the manufacturer's instructions before use. Any person purchasing and or using this equipment assumes the responsibility for seeking proper training in its use. Purchaser also assumes all risk for any injury or damage sustained while using any of this equipment. Failure to follow these warnings increases the risk of injury and death.



A five-year life span is the maximum recommendation for all continuous use ARS products once put into service. All ARS products have a five-year shelf life from the effective date of service.

Any ARS product must be in good working condition and pass a manufacturers inspection in order to extend the service life beyond five years. Any system that is over five years and is in POOR inspection condition must be removed from service.



The -DANGER- sign is used throughout this product manual to highlight procedures, techniques, or circumstances that can lead to severe injury or death of the person using this product.



The -CAUTION- sign is used throughout this product manual to highlight policies, procedures, and practices that when not followed could result in the damage or destruction of this product.



The -i- information sign is used throughout this product manual when referring the reader to an outside source for further information regarding this product.



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# 1.0 GENERAL INFORMATION

## 1.1 INTRODUCTION-

The ARS Heli-Bridle® Portable Safety Device (PSD) is a multi-aircraft portable safety device intended for the capture of human cargo in the event of separation from the primary external load carriage system (i.e. cargo hook, etc). The Heli-Bridle® PSD is an isolated component used for emergencies and is NOT designed as a primary external load carriage system. The Heli-Bridle® PSD is a temporary, portable device and is to be installed before and removed after human external cargo (HEC) operations.

Alterations to the Heli-Bridle® PSD and aircraft for its use are not allowed.

## 1.2 HELI-BRIDLE® SHORT HAUL ANCHOR AND RELEASE SYSTEM-

- Only portable safety device currently manufactured that meets the requirements set forth by the US Federal Aviation Administration for portable safety devices (See Appendix 1).
- Specifically Designed and Built for "LIVE HUMAN LOAD" with manufacturer's certification of same.
- Built in the USA -Berry Amendment (USC, Title 10, Section 2533a) compliant.
- UL Listed, NFPA 1983, 2012 Edition General Rated Anchor.
- ISO 9001 Manufacturer's Certificate of Compliance (MBS and "Built-to" Specification).
- Single 3-Ring Release Design (reduces chance of system fouling from the use of multiple release devices).

## 1.3 SINGLE BAND CONFIGURATION-

- Type II Mil Spec webbing - Minimum Rated Breaking (MBS) strength of 10,000 lbs.
- As built- MBS of 10,500 lbs.
- All American forged hardware - proof loaded to rated strength.
- Adjustment Buckles tested to 10,500 lbs. for three (3) minutes.
- Billet aluminium pull handle with ARM/UNARM feature.
- 3/16" Pull Cable with MBS of 2200 lbs.
- 1/2" 316L Stainless Steel Cable Housing (Sealed, UV Stabilized).

## 1.4 HARD POINT MOUNTED CONFIGURATION-

- Type II Mil Spec webbing - Minimum Rated Breaking (MBS) strength of 10,000 lbs.
- All American forged and certified welded components.

## 1.5 THREE RING RELEASE-

- Single piece unit MBS 9,000 lbs.
- Releases with one hand pull (no more than 27 lb) with 2500 lb load.
- All American forged and certified welded components.

## 1.6 HOOK EXTENSION-

- Single piece unit MBS 10,500 lbs.
- All American forged hardware proof loaded to rated strength.

## 2.0 INSTRUCTIONS / LIMITATIONS FOR AIRWORTHINESS

### **INSTRUCTIONS FOR CONTINUED AIRWORTHINESS -**

This product manual serves as the Instructions for Continued Airworthiness (ICAs) for the Heli-Bridle® PSD.

- This document lists user operating instructions, operational capability and equipment limitations for the Heli-Bridle® PSD.
- This document includes instructions on how and when to conduct inspections as well as product maintenance and storage procedures.
- As approved changes to any ICA's are implemented they will be disseminated to all users recorded in Air Rescue System's sales records.
- This manual does not contain any troubleshooting information as any alterations or repairs to the Heli-Bridle® PSD not conducted by Air Rescue Systems may damage structural integrity, are prohibited, and void the product warranty.

### **AIRWORTHINESS LIMITATIONS -**

- A preflight safety check must be performed by the operator every time the device is used.
- A post-flight inspection must be performed every time the device is stowed.
- A routine inspection must be performed every time the device has been stored for a period of greater than 30 days.
- An in depth quarterly inspection must be performed every three months and logged in the label packet secured to the victim extraction device.
- With routine inspections, a five-year life span is the maximum authorized use for all continuous use webbing products once put into service.



If the Heli-Bridle® PSD is used as it is intended, and the load is transferred to the Heli-Bridle® PSD during an emergency procedure, the Heli-Bridle® PSD must be removed and returned to Air Rescue Systems for an in-depth, complementary safety inspection before placing back in service.



## 3.0 OPERATING LIMITATIONS

### 3.1 SAFE WORKING LOAD FOR THE HELI-BRIDLE® PSD:

Safe working load for the Heli-Bridle® PSD is **900 lbs** and is based off of the system's 10:1 safety margin, and is not aircraft specific.

### 3.2 MAXIMUM PERSONS ALLOWED DURING USE OF THE HELI-BRIDLE® PSD:

The maximum number of persons allowed during the use of the Heli-Bridle® PSD should not exceed the safe working load of **900 lbs**. Aircraft configuration and capabilities should also be taken into consideration.

### 3.3 MAXIMUM AIRSPEED:

Airspeed should be governed by flight characteristics and pilot ability and should not exceed environmental performance  $V_{NE}$  or demonstrated system ability as outlined in aircraft specific rotor craft flight manuals.

Air Rescue Systems recommends the following flight guidelines, however, the operator is responsible for their own policy regarding airspeed limitations:

- An aircraft, with the Heli-Bridle® PSD attached, should not exceed **60-70 KIAS** with a Human External Cargo (HEC) load attached and should not exceed **70 KIAS**.
- An aircraft, with the Heli-Bridle® PSD attached, should not exceed **70 KIAS** with no load attached.

### 3.4 WEATHER LIMITATIONS:

Weather limitations of the Heli-Bridle® PSD are in accordance with federal regulations for external load operations.

### 3.5 WEIGHT AND BALANCE AND CG LIMITATIONS:

Weight and balance data shall be considered for each flight.

Maximum weight to be carried on the Heli-Bridle® PSD system: **900 lbs**.

Longitudinal station: See aircraft specific Rotorcraft Flight Manual or consult your maintenance personnel. By design, the forward/aft CG shift is minimal and is typically 6-8".



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## 4.0 INSTALLATION OF THE HELI-BRIDLE®

### THESE INSTALLATION INSTRUCTIONS ARE FOR AIRCRAFT REQUIRING THE USE OF A “BELLY BAND”

#### 4.1 – IDENTIFY THE COMPONENTS

NOTE: By installing the Heli-Bridle® Portable Safety Device (PSD) system, you agree that you have read and agree to ARS's End User agreement and acknowledge that this system is for the specific purpose of providing a portable safety device for use in HUMAN EXTERNAL CARGO (HEC) EXTERNAL LOAD OPERATIONS ONLY. If you do not agree to the end user terms, have modified the Heli-Bridle® PSD, or plan to use for external load operations other than HEC – STOP INSTALLATION IMMEDIATELY.

##### 4.1.1 Heli-Bridle® PSD

- Type II Mil Spec webbing - Minimum Rated Breaking (MBS) strength 10,000 lbs.
- As built- MBS of 10,500 lbs
- All American Forged Hardware- proof loaded to rated strength
- Adjustment Buckles tested to 10,500 lbs. for three (3) minutes
- Built in chaffing guard and oil/fuel protection layer
- Billet aluminium pull handle with ARM/UNARM feature
- 3/16” Pull Cable with MBS of 2200 lbs.
- ½” 316L Stainless Steel Cable Housing (Sealed, UV Stabilized)



#### 4.1.2 3-Ring Release

- Single piece unit MBS 9,000 lbs
- Releases with one hand pull (no more than 27 lb) with 2500 lb load
- All American forged and certified welded components



#### 4.1.3 Hook Extension

- Single piece unit MBS 10,500 lbs
- All American forged hardware proof loaded to rated strength

Two variations:

- 1) Onboard Systems Hook Extension (Upper)
  - 14 inch
  - 12 inch
  - 8 inch
  - 6 inch
- 2) Breeze Eastern Hook Extension for “keepereed” hooks (Lower)



#### 4.1.4 Carabiner

Two variations:

- 1) 12mm rated screw-link (Upper - early versions of Heli-Bridle®)\*\*
- 2) 72kN 3-Stage Steel Carabiner (Lower - currently utilized)\*\*



\*\*Substitutions with hardware other than that provided or approved, in writing, by Air Rescue Systems immediately voids any warranty, expressed or implied, and may result in injury and/or death.





## **4.2 – PREPARATION OF COMPONENTS PRIOR TO INSTALLATION**

### **PRE-FLIGHT INSPECTION OF SECONDARY SAFETY DEVICES ARE REQUIRED PRIOR TO COMMENCING HUMAN EXTERNAL CARGO (HEC) OPERATIONS**

1. Perform a detailed inspection per the guidelines outlined in the Inspection Guide (Appendix 3)
  - a. Webbing and Straps
    - i. Check for tears, abrasions, loose/missing threads
    - ii. Check for wear and tear where webbing/straps meet hardware
  - b. Hardware
    - i. Check for dings, dents, nicks, etc.
  - c. See inspection guide for detailed instructions.
2. Verify that the following items have been checked for operational readiness
  - a. Connection Points
  - b. Anchor Components
  - c. Release System
3. Verify that device has not been altered.
4. Verify that the installation of the Heli-Bridle® PSD will not interfere with, cause changes in the operation of, cause alteration or damage to, or otherwise alter the airworthiness of the aircraft.

### 4.3 – INSTALLATION OF THE HELI-BRIDLE® PSD ON THE AIRCRAFT

\*\*\*No tools are needed to facilitate the installation\*\*\*

1. Place each end of the device around the center of the fuselage so that they meet in the middle of the cabin section.

The Heli-Bridle® PSD webbing should be close to the fuselage and not on the outside of a step, etc.



2. Connect the Cam Lock buckle.

Make sure the open connection is facing up and the spring-loaded locking tongue is in the fully closed position (upper).



3. Fold the excess webbing from the extension straps and secure with attached velcro straps.



4. Connect the empty hook extension to the aircraft's primary cargo system (i.e. cargo hook).



5. Set up the 3-Ring Release as illustrated.

1. Verify that the cable is installed as illustrated.



6. Connect the steel carabineer (or screw-link on previous models) on the underside of the aircraft fuselage.

1. Connect the D-Ring on the hook extension to the D-Ring on the 3-ring release using the supplied 72kN carabiner.

2. Connect the rope to the same carabiner that was just installed on the 3-Ring Release and hook extension.

3. Verify that the installation of the Heli-Bridle® PSD will not interfere with, cause changes in the operation of, cause alteration or damage to, or otherwise alter the airworthiness of the aircraft.



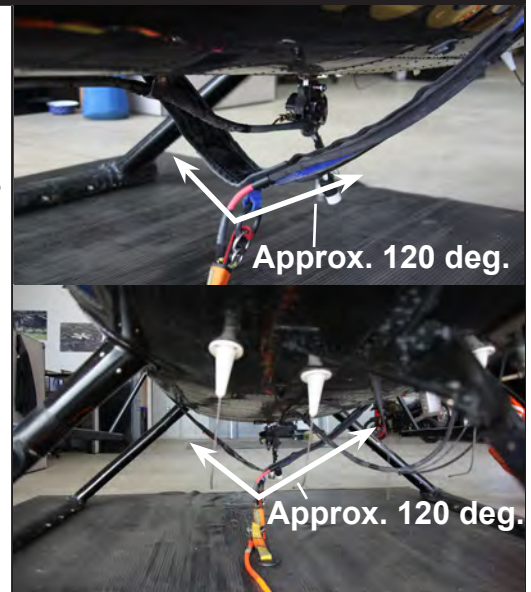
7. Run and connect the release cable from the cabin area along the side of the helicopter to the release handle mounting location, located on the outside of the collective housing unit.

It is recommended that temporary fasteners, such as zip ties, be used as to not alter the airframe.



8. Verify that the band is installed with a sloping angle towards the primary cargo system (i.e. cargo hook). The Heli-Bridle® should not be installed in a manner which causes it to lie flat across the underside, or pulled tight, the aircraft fuselage.

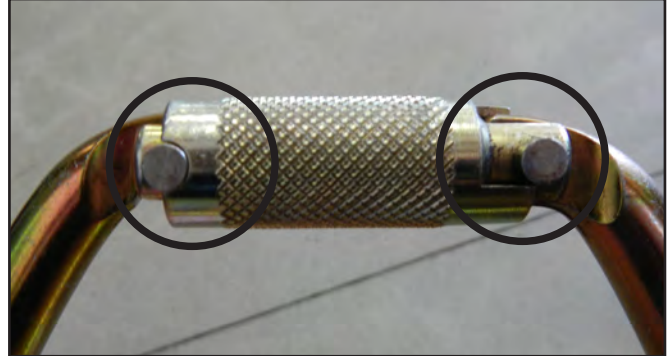
The length of the belly band portion of the Heli-Bridle® PSD should be adjusted so that the angle of the "v" is approximately 120 degrees.





9. Assure that the gate on the carabiner is fully closed and locked.

**GATE CLOSED AND LOCKED:**



A gate on a fully closed and locked carabiner will not be able to open by simply pressing on the gate itself. A properly locked carabiner will only be able to be opened by sliding down the gate mechanism and rotating it to the unlocked position.

**GATE CLOSED AND NOT LOCKED:**



## 10. Secure the handle base to the aircraft.

### **INITIAL INSTALLATION:**

1. Clean the surface of the aircraft to which the mountable base plate is to be secured.
2. Remove the protective strip from the mounting tape. Gently heat both the newly cleaned aircraft surface and the mounting tape with a heat gun.
3. Press the mounting plate onto the desired surface of the aircraft, hold in place and maintaining pressure on it for two (2) minutes.
4. Install the Heli-Bridle® PSD handle base as described below.





## 11. Secure the handle base to the aircraft, cont.

### **SUBSEQUENT INSTALLATION:**

1. Lift up on the slide latches located on the face of the Heli-Bridle® PSD handle base.
2. Place the handle base onto the base plate mounted to the aircraft. When placed correctly, the two posts on the base plate will pass through the two holes on the handle base allowing the entire assembly to be secured together by sliding the handle base mounted slide latches onto said posts.
3. Push down on the handle base mounted slide latches, until they click, so that they interface with the posts on the base plate.



### 4.3.1 Types and Configurations of Heli-Bridle® Handles

HANDLE RELEASE TYPES		MOUNTING OPTIONS
Flat Heli-Bridle® PSD Release Handle.		The Flat Release Handle has a 4.5 x 5 inch mounting base and can be mounted either vertically or horizontally in the cockpit.
90 Degree Heli-Bridle® PSD Release Handle.		The 90 Degree Release Handle has a 4.5 x 5 inch mounting base and can be mounted either vertically or horizontally in the cockpit.
45 Degree Heli-Bridle® PSD Release Handle.		The 45 Degree Release Handle has a 4.5 x 5 inch mounting base and can be mounted either vertically or horizontally in the cockpit.
Spotter Release Heli-Bridle® PSD Handle.		The Spotter Release Handle is mounted directly on the Heli-Bridle® PSD band and is intended for rear crew release.
<ul style="list-style-type: none"> <li>• All Heli-Bridle® PSD Handles are mounted using 3M™ VHB™ Heavy duty, double sided tape. This product provides outstanding durability and high performance.</li> <li>• Custom Heli-Bridle® PSD Handle mounting options and Heli-Bridle® PSD Systems are available upon request. If you would like a custom build, please contact ARS with your specific aircraft specification and operational needs.</li> </ul>		

## **4.4 – REMOVAL OF THE HELI-BRIDLE® PSD FROM THE AIRCRAFT**

\*\*\*No tools are needed to facilitate the installation\*\*\*

Removal of the Heli-Bridle® PSD is accomplished in the same manner in which it was installed.

1. Remove Hook Extension from primary cargo system (i.e. cargo hook).
2. Unhook carabiner from the rope and 3-Ring Release system.
3. Remove handle base from aircraft.
4. Remove cable housing from the aircraft.
5. Remove all devices.
6. Inspect device per inspection guidelines.

## **4.5 – MAINTENANCE AND STORAGE OF THE HELI-BRIDLE® PSD**

Maintenance of the Heli-Bridle® PSD.

### **4.5.1 Maintenance and Inspection -**

- Before and after each use, inspect the Heli-Bridle to ensure that it is in a serviceable condition.
- Check for worn or damaged parts.
- Ensure all hardware (D-Rings, buckles, etc.) are present.
- Inspect all hardware to ensure they do not have any sharp edges, burrs, cracks, or corrosion.
- Inspect webbing for wear, cuts, burns, frayed edges, or any other damage.
- Inspect all stitching for abrasion, discoloration, and wear to ensure integrity.
- Thoroughly inspect Heli-Bridle after any period of storage greater than 30 days.

**Discontinue use of this Heli-Bridle device and remove from service if inspection reveals any doubt about the safety or serviceability.**

### **4.5.2 Advanced Inspection -**

- For advanced inspections contact: Air Rescue Systems at [info@airrescuesystems.com](mailto:info@airrescuesystems.com)  
Phone: 541-488-0941 Fax: 1-800-944-4135

### **4.5.3 Storage Instructions -**

- Store ARV in a cool, dry, and clean environment out of direct sunlight.
- Do not expose ARV to flame or high temperature environments.
- Avoid contact with any corrosive or caustic chemical agents to include but not limited to acids, bases, or petroleum products.
- Avoid storage and use of ARV in areas where chemical vapours may exist.

### **4.5.4 Cleaning Instructions -**

- Discontinue use of product, and contact ARS, for advanced inspection if it has come into contact with any of the above listed or other suspect chemical agents.
- Clean product with warm water in a mild detergent solution.
- Wipe off hardware with a clean dry cloth and hang product to air dry.
- Dry in ventilated, cool, and shaded area. Do not force dry with heat.



#### 4.5.4 Proper Storage Instructions -

- After the Heli-Bridle® PSD has been cleaned and inspected, proper storage of the product is essential for continued use and extended lifetime of the product.
- For best storage, roll the Heli-Bridle® PSD so that the band is in the center of the roll, while the cable, handle, and 3-Ring release are on the outside.
- Be sure that there are no kinks or bends in the cable, as this will damage the system.
- It is recommended to use cord or straps to keep the Heli-Bridle® PSD securely rolled.
- Store the Heli-Bridle® PSD in the bag provided in order to keep the system dirt and contaminant free.



## 5.0 ASSEMBLY OF THE 3-RING RELEASE

During the course of inspection of the Heli-Bridle® PSD System, it will be necessary to remove the 3-Ring Release portion of the system. Extreme care should be taken to assure this portion of the system is reassembled correctly. Failure to re-assemble the Heli-Bridle® PSD System properly may result in extreme injury or death.

1. Place the open 3-Ring Release next to the 4-inch ring of the Heli-Bridle® PSD.



2. Place the 2.5" ring of the 3-Ring Release inside the 4-inch ring of the Heli-Bridle® PSD.



3. Fold the 2.5" ring on the 3-Ring Release over the 4" ring of the Heli-Bridle® PSD.



4. Place the 1.75" ring on the 3-Ring Release inside the 2.5" ring and fold it over as depicted.



5. Fold the multi-colored loop over the top of the 1.75" ring and feed it through the eyelet on the 3-Ring Release.

***Note: The multi-colored loop depicted as yellow and blue in the illustrations may be a variety of color combinations on your particular 3-Ring Release system. There is no structural difference in the potentially varying colors.***



5. Fold the multi-colored loop over the top of the 1.75" ring and feed it through the eyelet on the 3-Ring Release, cont.

Be sure the the multi-colored loop is fed from the top down, right to left, and over the 1.75" ring as depicted (upper) and not fed from the bottom up underneath the 1.75" ring (lower).



6. Flip the 3-Ring Release over and feed the multi-colored loop through the hole in the black cable tang.





## 7. Completely feed, and pull through, the yellow cable through the multi-colored loop.

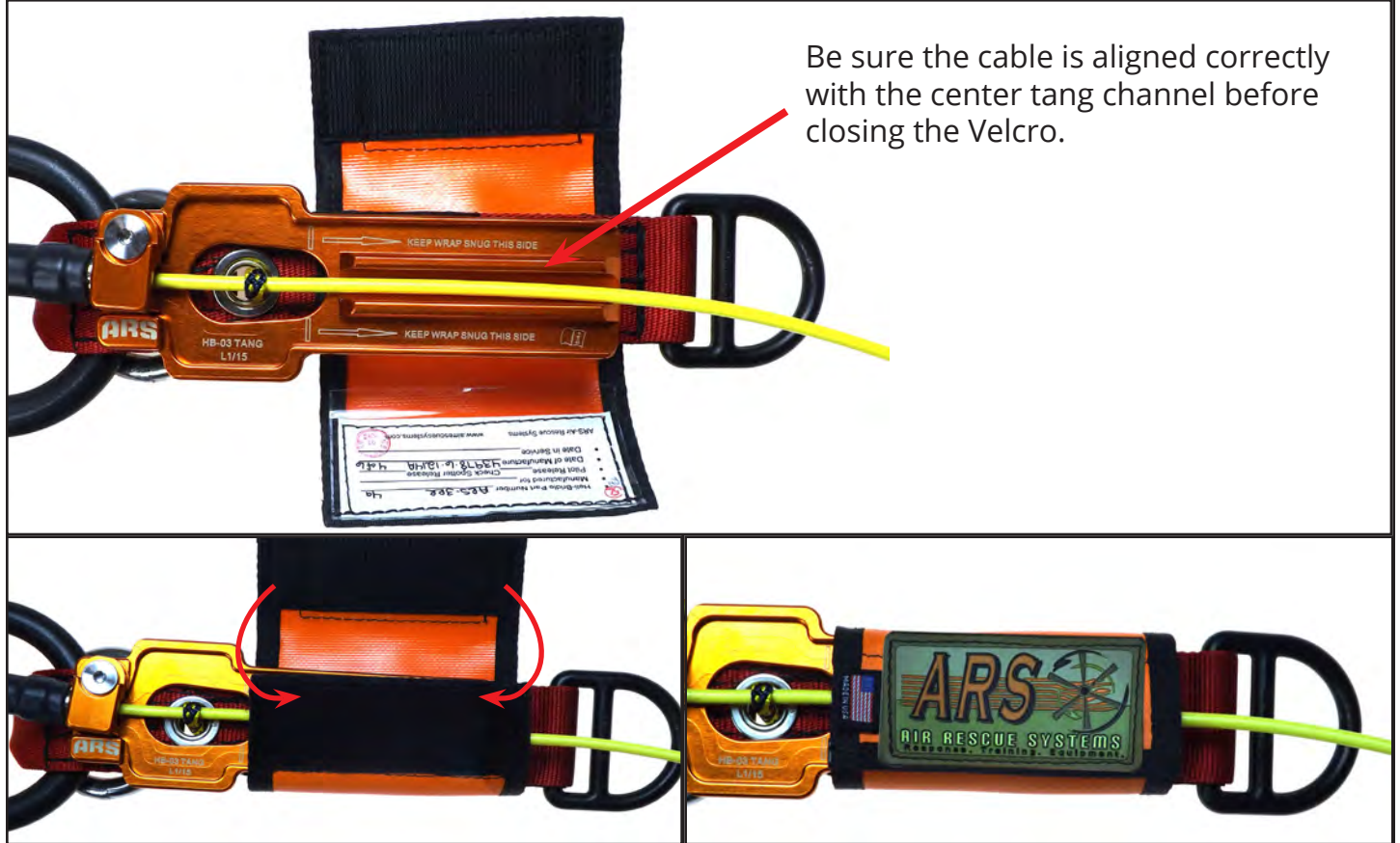
While the cable is flexible, be sure not to put a kink into the cable while feeding it through the multi-colored loop.



When feeding the cable through the multi-colored loop, be sure that the loop is through the hole in the cable tang and that the cable tracks correctly in the center groove of the tang, leaving approximately 1 1/2 inches of cable extending past the D-ring.



8. Secure the cable tang and cable and cable assembly to the 3-Ring Release by folding over the orange Velcro flaps.



## 6.0 HARD POINT ATTACHMENT FOR THE HELI-BRIDLE





## 7.0 NORMAL OPERATING PROCEDURES

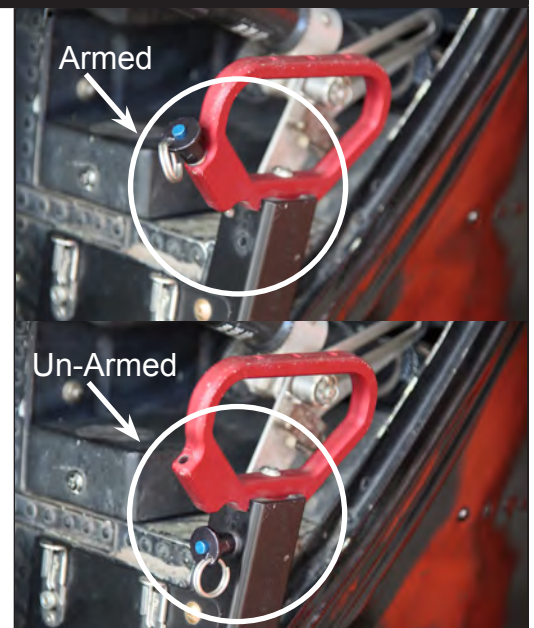
**OPERATIONS SHOULD BE COMPLETED IN ACCORDANCE WITH AIRCRAFT MANUFACTURER'S ESTABLISHED PERFORMANCE GUIDELINES AS WELL AS IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL GOVERNING AGENCIES, INCLUDING THE FEDERAL AVIATION ADMINISTRATION.**

1. After the installation of the Heli-Bridle® PSD on your aircraft has been completed, prior to flying human external cargo (HEC), arm the release handle of the Heli-Bridle® PSD system.

1. Arming the system is accomplished by removing the pin from the handle base and placing in its storage position in the handle.

*NOTE: In order to remove or replace the pin, the button on the head of the pin must be depressed while simultaneously removing or inserting the pin from the handle base. These simultaneous actions prevent the Heli-Bridle® PSD system from spontaneously arming itself. It is recommended that only the pilot perform the arm/unarm function for the Heli-Bridle® PSD system.*

2. Unarming the system, after completing HEC flights, is accomplished by replacing the pin in its original position on the handle base.





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## 8.0 EMERGENCY OPERATING PROCEDURES

**OPERATIONS SHOULD BE COMPLETED IN ACCORDANCE WITH AIRCRAFT MANUFACTURER'S ESTABLISHED PERFORMANCE GUIDELINES AS WELL AS IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL GOVERNING AGENCIES, INCLUDING THE FEDERAL AVIATION ADMINISTRATION.**

**TRANSFER OF A LOAD TO THE HELI-BRIDLE® PSD SYSTEM CONSTITUTES AN EMERGENCY. IN THE EVENT THIS SHOULD OCCUR, THE AIRCRAFT SHOULD LAND AS SOON AS AIRCRAFT PERFORMANCE AND SAFETY DICTATES.**

In the event of a failure of your aircraft's primary cargo system (cargo hook) while utilizing the Heli-Bridle® PSD, the load will automatically be transferred to the Heli-Bridle® PSD thus preventing the load's departure from the aircraft.

The pilot-in-command may elect to perform the following procedure(s):

### Option 1

1. In the event of a failure of your aircraft's primary cargo system (cargo hook) while utilizing the Heli-Bridle® PSD, the load will automatically be transferred to the Heli-Bridle® PSD thus preventing the load's departure from the aircraft.
2. Land as soon as aircraft performance and safety dictate.
3. Should the situation dictate jettisoning the short-haul line from the aircraft, proceed to option 2.

## Option 2

Should the situation dictate jettisoning the short-haul line from the aircraft, perform the following steps:

1. Grasp red release handle
2. Pull straight up, at least 8", on the red release handle.
3. Land the aircraft as the situation dictates.

**Note:** In order to be able to articulate the red release handle, the Heli-Bridle® PSD must have been armed by removing the safety pin as described in the NORMAL OPERATING PROCEDURES section.



# APPENDIX I

## FAA INFO DOC 12051 - PORTABLE SAFETY DEVICE



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

## InFO

Information for Operators

InFO 12015  
DATE: 9/10/12

Flight Standards Service  
Washington, DC

[http://www.faa.gov/other\\_visit/aviation\\_industry/airline\\_operators/airline\\_safety/info](http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info)

*An InFO contains valuable information for operators that should help them meet certain administrative, regulatory, or operational requirements with relatively low urgency or impact on safety.*

**Subject:** Classifying and Using a Belly Band System as a Portable Safety Device (PSD) in Part 133 Operations

**Purpose:** This InFO clarifies the use of PSDs for helicopter operators performing Title 14 of the Code of Federal Regulations (14 CFR) part 133 Class B external-load operations that involve the carriage of persons in accordance with § 133.35. It also provides recommendations for further equipment safety improvements for § 133.35 operations.

**Background:** A belly band system, also known as an emergency anchor, is classified as a PSD and has been used in helicopter external-load operations involving humans. This type of PSD is typically a strap that extends through the aft cabin doors around the helicopter's flooring and belly. It hangs beneath the helicopter between the landing gear and is inserted through the primary attaching means to serve as a secondary attaching means for the external crewmember. The PSD is intended to improve human external cargo (HEC) safety by reducing the chance of an accidental death in case the primary attaching means release system fails.

**Discussion:** Section 133.35 permits the carriage of persons under rotorcraft-load combination Class B. The operator must determine that personnel carried under § 133.35 meet one of the requirements as stated in the rule. This type of carriage is often done in connection with the external-load activities directly associated with power line construction, inspection, and utility maintenance. PSDs are not typically manufactured under a Federal Aviation Administration (FAA) approval process (per 14 CFR part 21, § 21.8). Also, a supplemental type certificate (STC) is not required since PSDs are not permanently installed. However, along with the jettison requirements of the primary attaching means, the PSD should also be evaluated by the operator to ensure:

- The PSD material meets the accepted industry standard of National Fire Protection Association (NFPA) 1983, or equivalent;
- Includes installation requirements and instructions necessary for continued serviceability;
- Quick release;
- Ability to jettison without endangering the helicopter; and
- No sudden and unacceptable shift in the center of gravity.

**Operator Evaluation:** Use of the PSD is not required for Class B external-load operations. However, if you choose to use the PSD, you must ensure that it does not endanger the safe operation of the aircraft.

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OPR: AFS-350

This would include an evaluation to show that the load is transportable and releasable, when necessary, without hazard to the helicopter during both normal and emergency flight conditions.

**Recommended Action:** To fully realize the safety benefits of the PSD it must be maintained and the crews utilizing the device must be trained. In addition, operators should consider the additional equipment upgrades associated with HEC.

1. Inspect and Maintain the PSD.

The operator should inspect and maintain PSDs as necessary to ensure they function properly and safely to protect crewmembers. This also ensures that the PSDs will not adversely affect the safe operation of the helicopter.

2. Develop Operational Training Procedures.

The operator should develop operational training procedures that include procedures for emergency release of the PSD and the primary attaching means in case either system fails to release.

3. Additional Equipment Upgrades:

- Substantiate a higher static limit load [3.5 load limit] for the external load attaching means and corresponding personnel carrying device system;
- Incorporate separate dual actuation devices in both the primary and backup quick-release systems in the aircraft;
- Substantiate more stringent electromagnetic interference and lightning protection for the quick-release system in the aircraft;
- Use a personnel carrying device system with improved structural integrity and personnel safety features.
- Conduct a fatigue evaluation of the aircraft quick release system, attaching means, and personnel carrying device system.

**Contact:** Questions or comments regarding this InFO should be directed to the General Aviation and Commercial Division, Commercial Operations Branch, AFS-820, at (202) 385- 9600; and the Aircraft Maintenance Division, General Aviation Branch, AFS-350, at (202) 385-6435.

# **APPENDIX II**

## **AIR RESCUE SYSTEMS - END USER AGREEMENT**



**AIR RESCUE SYSTEMS**

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Ashland, OR 97520

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www.airrescuesystems.com

### **END USE AGREEMENT**

Air Rescue Systems Corporation, henceforth known in this agreement as "ARS" proposes this to:

\_\_\_\_\_  
(PRINT YOUR NAME HERE)

Henceforth known in this agreement as "You" or "you"

By using ARS equipment or any portion thereof ("equipment" or "ARS Equipment") you agree to the following terms and conditions (the "Terms and Conditions"). ARS Equipment and any portions thereof, is referred to herein as the "Services." By agreeing to these Terms and Conditions, you represent that you are 18 years old or older and capable of entering into a legally binding agreement. If you are a business entity, you also represent that you are duly authorized to do business in the country or countries where you operate and that your employees, officers, representatives, and other agents accessing the Services are duly authorized to access the Services and to legally bind you to these Terms of Services.

#### **1. WARNING**

Products manufactured or sold by ARS are intended for use by professionals trained and experienced in the use, inspection, and maintenance of these products. Many products which ARS manufactures/sales are used in helicopter operations which pose a substantial risk of serious injury or death. You must read and understand all of the manufactures instructions before use. Any person purchasing this equipment assumes the responsibility for seeking proper training in its use and care. Purchaser also assumes all risk for any injury or damage sustained while using any of this equipment. Failure to follow these warnings increases the risk of injury and death.

#### **2. USE OF EQUIPMENT**

You agree to use equipment as intended and comply with all applicable laws and regulations. You also agree to follow manufactures instructions for use, care, and retirement.

#### **3. PRIVACY POLICY**

Protecting customers' privacy is important to ARS. You acknowledge and agree that ARS may access, pre-server, and disclose your account information if required to do so by law or in a good faith belief that such access preservation or disclosure is reasonably necessary to" (a) satisfy any applicable law, regulation, legal process or government request, (b) enforce these Terms and Conditions, including investigation of potential violations hereof, © detect, prevent or otherwise address fraud, security or technical issues, (d) response to customer support requests, (e) protect the rights, property, or safety of ARS, its users, and the public. ARS will not be responsible or liable for the exercise or non exercise of rights under these Terms and Conditions.

#### **4. PROPRIETARY RIGHTS**

You acknowledge that (a) the equipment and documentation contains proprietary and confidential information that is protected by applicable intellectual property and other laws, and (b) ARS owns all rights, title and interest in and to the equipment and documentation therein and thereto. "Intellectual Property Rights" means any an all rights existing from time to time under patent law, copyright law, trade secret law, trademark law, unfair competition law, and any and all proprietary rights, and any and all applications, renewals, extensions, and restorations thereof, nor or hereafter in force and effect worldwide. You agree that you will not, and will not, allow any third party to, (i) copy, sell, license, distribute, transfer, modify, adapt, reverse engineer, disassemble, or other attempt to derive manufacture process, unless otherwise permitted, or (ii) remove, obscure, or alter ARS's copyright notices, trademarks, or propriety rights notices affixed to or contains within it accessed in conjunction with equipment and equipment documentation.



5. UPDATES AND REVISION NOTICES

ARS may from time to time make available updates to the Equipment, such as minor repairs, design, new versions (UPDATES). Revision notices may be received by request at [info@airrescuesystems.com](mailto:info@airrescuesystems.com)

6. EXPORT RESTRICTIONS

The equipment may be subject to export controls or restrictions by the United States or other countries or territories. You agree to (i) comply with the requirements of the US Department of Commerce (DOC) Export Administration Regulations (EAR) (see <http://www.bis.doc.gov>) and all applicable international, national, state, regional and local laws, and regulations, including without limitation any applicable import or use restrictions (ii) not export, or re-export, directly or indirectly, the equipment to any country outlined in the EAR, nor to any person or entity on the DOC Denied Persons, Entities and Unverified Lists, the US Department of State's Debarred List, or on the US Department of Treasury's lists of Specially Designated Nationals, Specially Designated Narcotic Traffickers, or Specially Designated Terrorists, (iii) not export, or re-export the equipment to any military entity not approved under EAR, or to any other entity for military purposes, and (iv) not license, sell, provide, distribute the equipment for use in connection with chemical, biological, or nuclear weapons or missions capable of delivering such weapons.

7. COMPLIANCE WITH LAWS

You agree to comply with all federal, state, and local laws and regulations regarding the use, care, and installation of the equipment.

8. INDEMNITY

You agree to hold harmless and indemnify ARS and its subsidiaries, affiliates, officers, agents, and employees from and against any claim, suit or action arising from or in any way related to your use of ARS Equipment or your violation of these Terms and Conditions, including any liability or expense arising from all claims, losses, damages, suits, judgements, litigation costs and attorneys' fees, of every kind of nature. In such case, ARS will provide you with written notice of such claim, suit of action.

9. LIMITATION WARRANTY

ARS warrants for one year from purchase date and only to the original retail buyer that our products are free from defects in material and workmanship. If the buyer discovers a warranty related defect, the buyer should return the product to ARS. ARS reserves the option to repair or replace any product returned under warranty. That is the extent of ARS's liability under this warranty and, upon the expiration of the applicable warranty period, all such liability shall terminate.

10. WARRANTY EXCLUSIONS

ARS does not warrant products against normal wear and tear, unauthorized modification or alteration, improper use, improper maintenance, accident, misuse, negligence, damage, or if the product is used for a purpose it is not designed or intended. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Except as expressly stated in this warranty, ARS, shall not be liable for direct, indirect, incidental, or other types of damage arising out of, or resulting from the use of the product.

11. NO THIRD PARTY BENEFICIARIES

You agree that, except as otherwise expressly provided in these Terms and Conditions, there shall be no third part beneficiaries to these Terms and Conditions.

Signed:

Dated:

---

**(SIGN HERE)**

Print Name:

Title:

## **APPENDIX III**

# **EQUIPMENT INSPECTION GUIDE**

### **Short Haul Equipment Inspection Guide**

A systematic and consistent approach to the inspection of the short haul equipment will ensure proper function, safety and extended component life. Intermittent (at least quarterly) and post use inspections are required. The following outlines basic inspection techniques and points to consider.

#### **Heli-Bridle and System Components:**

**Hardware components:** The majority of the hardware components in the ARS Short Haul System are forged steel and require little attention.

- Inspect for proper movement and function. Make sure parts fit together without excessive friction. Check for deformity, dings and missing material. Small dings and scratches are acceptable. Unless substantial material is missing (1MM in depth or greater) there is no need to remove the components from service.
- Never apply wet, oil based lubricants. If lubricant is needed on hardware components use a pure silicone spray. Remove ALL over-spray from areas around moving parts. Silicone works well as a lubricant and reduces the attraction and build up of dirt on your gear.

**Software components:** Comprise the bulk of the ARS Short Haul System. Because of this, special attention is required when performing inspections.

- Closely inspect software. Look for abrasions, soiled areas, discolored areas and signs of excessive wear.
- Run your hands over the system...feel for soft areas and areas of “hardness”, which could be the result of friction from shock loading, abrasion or chemical contamination. Normal use may result in slight fraying of software materials. This is expected.
- Threaded stitching areas: Inspect for loose threads, missing threads, and sewn components coming apart. Normal use may result in slight fraying of thread material. This is expected.

**Release system and handle base:** The release system is comprised of the 3Ring Release, pull cable and handle.

- Inspection of the soft/hardware components of this system is exactly the same as mentioned earlier. However, there are some aspects that need specific attention.
- 3Ring stainless rings: These rings are certified welded stainless and their smooth function is critical in the operation of the release system. Check each ring for deformity dings and burrs. Small metal burrs have the potential to keep the release system from performing as intended.

- Release cable: Pull the cable out of the housing. Feel for rough spots or interior steel cable coming through coating. Replace the cable if damage is found. The cable may not pull through the housing and release the load if deformity or damage is present. Use a mild cleaner on the cable such as "Simple Green" by placing a small amount on a clean towel, pulling the cable through it.
- **Cable Lubrication:** ONLY use a small amount of DuPont Teflon "Multi-Use" Dry Wax Lubricant on a clean cloth (as in cleaning the cable), running the cable through the cloth. DO NOT USE THE LUBRICANT IN EXCESS.
- Handle and Lock Pin: The handle should slide in and out of the handle base easily. The lock pin must be able to move from the "arm-disarm" position without excessive friction or binding. Check for burrs or damage to handle.
- Cable housing and "Tang" end: The cable housing is made from 316L stainless steel. The covering on it is UV stabilized and provides a watertight seal. Check the cable housing from handle base to "Tang" end (the orange tongue that interfaces with the 3Ring release). Look for cracks, splits or deformities. The cable housing is the only protection in keeping the release cable free from damage. The cable housing can be cleaned out with high-pressure air when needed. Apply air from the handle end of the housing. Do not use water or other cleaners inside the cable housing.
- Internal housing lubrication: ONLY use a small amount of DuPont Teflon "Multi-Use" Dry Wax Lubricant sprayed into the housing (handle end). 1 or 2 second bursts and then run the cable through to the end.

### **Hook connection components:**

- The hook extension is the primary load-carrying component of the short haul system. It is comprised of both soft and hardware pieces. Inspect as noted above. Look for oil and fuel contamination. The hook extension is the most commonly replaced item during periods of heavy use.
- 3 Stage 72kN auto-lock carabiner connects the aircraft cargo hook (via the hook extension), the 3Ring Release and the short haul line. Inspect the carabiner as you would other hardware. Pay special attention to the gate. The action should be smooth. Stiff or hard to turn gates should be cleaned with soap and water then dried with forced air. Carabiners that remain stiff should be replaced.
- Soft Steel Short Haul Line: 100% Dyneema, kernmantle, "braid on braid" construction.
- The single 9/16" short haul line is THE critical piece of the short haul system. This is the only component where there is no redundancy. Like any other line or rope, treat it as if your life depends on it.
- Inspect visually- look for obvious damage, excessive abrasion, and "burn" spots (friction). Inspect physically, run the entire length of rope through your hands. Feel for obvious areas where material is missing in one spot and bunched up in another. Because of the line construction, braid on braid, it is normal for the looser woven inner core to bunch up inside the tighter outer braid. The appearance of this action makes the line look like a snake that has just swallowed a small animal. This is normal and happens from time to time based on the weight on the line and the load/unload cycle.

- The short haul line can be washed in mild detergent (such as “Citrosqueeze” PPE cleaner). Place the line in a large pail and agitate as needed. Change the water often with very dirty lines. Rinse well and daisy chain. Wipe down all hardware and hang the line in a well ventilated, shaded area until dry. DO NOT use a washing machine of any kind to wash the short haul. DO NOT force dry with heat.

### **LBS (Line Ballast System):**

- The LBS requires little care. Inspect the outside for damage. Look for holes that may allow shot to escape. This is not a major issue because the shot used as weight in the LBS is sealed and compartmentalized to avoid total loss of effective weight if the container were damaged.
- Inspect the inner prussic loops and 6mm screw links. Re-tie or re-tighten the loops as necessary. The entire LBS can be cleaned with mild detergent and warm water. Towel dry and reinstall.

\* LBS installation video can be viewed at: [www.airrescuesystems.com](http://www.airrescuesystems.com)

### **HELA-Rigs:**

- The HELA-Rig is the terminal end of the system...the aircraft to human interface. They are comprised of both soft and hardware components. Inspect as noted above.
- The orange or blue vinyl sheath covering the grey HELA-Rig legs is designed to be opened to inspect the internal webbing.
- Check the function of the double by-pass snap hooks (utility version) or the 2 Stage carabiners (rescue version) for ease of opening, correct closing and damage.



### **A NOTE ON SALT-WATER EXPOSURE:**

All equipment (hardware and software) should be thoroughly cleaned with fresh water and allowed to dry after salt-water exposure. The Heli-Bridle may be rinsed as long as precautions are taken to keep water out of the cable housing. If salt water gets into the cable housing, you will need to rinse it out with clean water and use a pressurized air source to blow-dry the inside of the cable housing. Re-apply a 3 second burst of Teflon spray into the cable housing from the handle end and run the cable through the housing a number of times to distribute the lubricant. Remove the cable and allow the Heli-Bridle to air dry in a shaded place. Re-assemble and test function.

### **SAFETY NOTICE:**

The equipment described above is utilized for the insertion and extraction of human loads. You, the End-User must understand ALL requirements of the system's use and function. If you, The End-User have any doubts about the readiness, safety, function or use of the Air Rescue Systems Heli-Bridle Short Haul Anchor and Release System or it's components, DO NOT USE IT! Contact Air Rescue Systems immediately for assistance in determining the safety and usability of your short haul equipment.

[www.airrescuesystems.com](http://www.airrescuesystems.com)

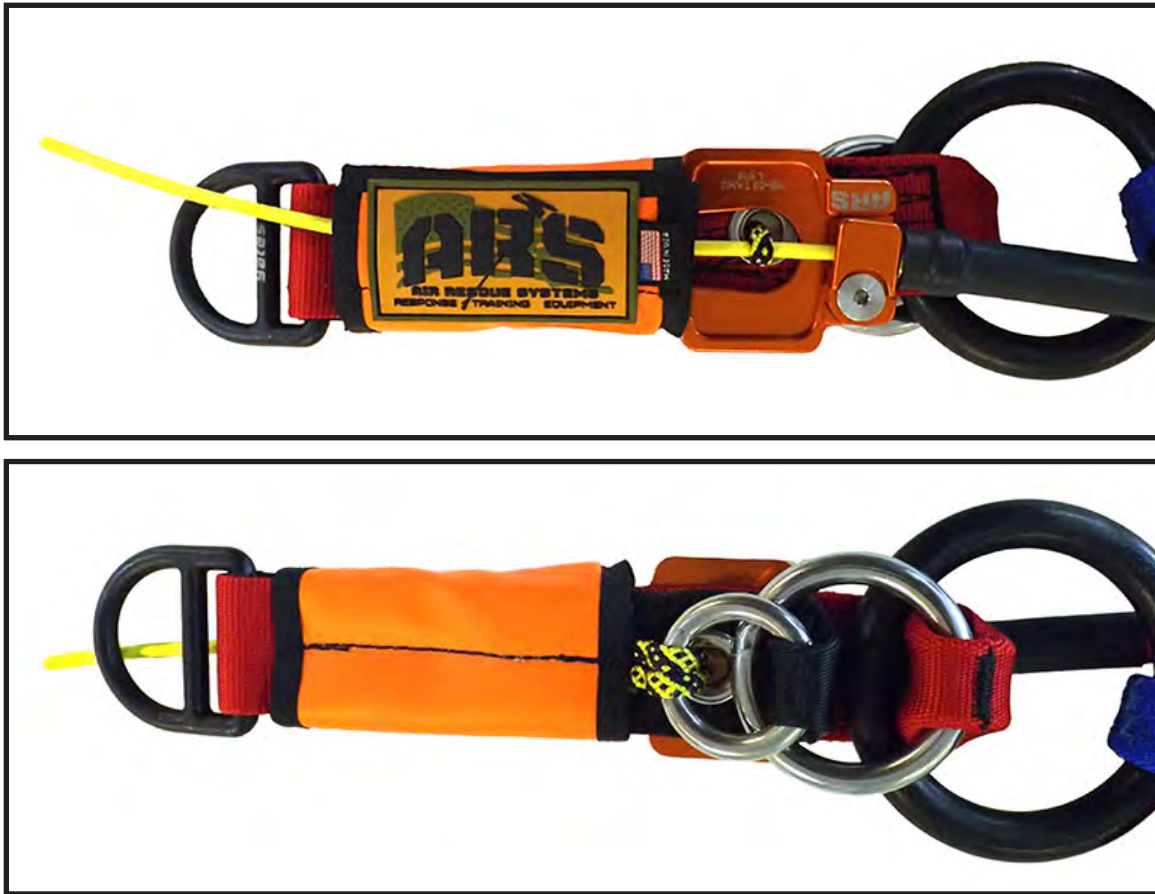
[info@airrescuesystems.com](mailto:info@airrescuesystems.com)

541-488-0941



## **APPENDIX IV**

### **3-RING RELEASE FOR SHORT HAUL**



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#### **History, Design and Function**

Over the past several years the discipline of short haul has witnessed a number of thrown together parts, pieces and pseudo systems supported by varying theories regarding best practices to jettison a load suspended on a secondary anchor (Heli-Bridle®, belly band, belly strap etc).

The critical, common piece of these endeavours, and typically the weak link is always the mechanism, which initiates the process of separating the load from the aircraft. Usually by knife, Capewell release and 3-Ring Release.

### **KNIFE:**

The knife obviously is cheap and on the surface seems to be a fairly easy process. The fact of the matter is that many variables come into play when planning on utilizing a knife or sharp instrument to cut the load away from the aircraft.

1. **Material to be cut.** Typically thick, sometimes protected by a sheath of “chafe” material. On occasion, rescue rope up to 9/16” diameter.
2. **Access to the material.** Once the “belly-band” is loaded with the weight of the HEC, can the knife be slipped under to cut or does a sawing action have to be employed.
3. **The cutting tool/knife vs. razor knife vs. seat-belt type cutters.** Typically seat-belt type cutters are useless...the thickness of the material or rope and again the issue of load on the system doesn't allow for effective use.
4. **The addition of another human in the event chain.** Rather than just one person making a decision and acting on it (to jettison or not to jettison), two must acknowledge the emergency, make the decision and then choose to act upon the decision. This all must happen in seconds.
5. **Lastly, the event itself...**can the actual act of cutting away the load even be performed? Spinning, dropping, bumping, fear, adrenaline to say the least, could make removing, engaging and cutting away the load impossible.

### **CAPEWELL RELEASE:**

The Capewell lanyard-type parachute canopy release is a hand-activated mechanical device for detaching the parachute harness from a canopy.

This release was developed for the military in response to paratroopers needs for a release device that would quickly free them from the parachute canopy upon landing. While being very strong, drop forged steel, a number of variables also come into play with regards to utilizing it as a short haul load release.

1. The addition of another human in the event chain. The Capewell also requires a second human inter-action to cause the release.
2. Again, the event itself.
3. Release position. Finally the biggest shortcoming of the capwell release when used as a short haul load release is that fact that the Capewell is centered inside the aircraft. Initiating release of the Capewell causes the two ends of the “belly-band” to come apart explosively, exiting the cabin at a high rate of speed and under tremendous force. The possibility of entanglement on aircraft steps, skids or worse, the poor person who just performed the release is very much a possibility. Recent test have shown entanglement to be a real danger.

Invented by Bill Booth in the 1970s, the 3-Ring is not without problems. Agencies looking for a better release than physically “cutting” away started using the 3-Ring. For years the parachute industry built and continues to provide small under sized 3-Rings better suited to release a chute than a short haul line. This small size coupled with the end short haul users needing a system with a 10:1 Static System Safety Factor (SSSF) made a larger, rescue based 3-Ring a necessity.

In 2007 Air Rescue Systems with assistance of John Yates, owner of Yates Gear found the software, hardware components and correct relationship of the “rings” to make a monster sized 3-Ring release. The build and test process at the Yates facilities was fairly difficult, utilizing parts from many different manufacturers to find the right combination. The end result was a 3-Ring Release with a minimum rated breaking strength (MBS) of 9000 lbs. This MBS allowed for three short haulers weighing 300 lbs each (a constant) to be placed on the end of the line supported by the 3-Ring and finally maintain a 10:1 SSSF ( $300 \times 3 = 900$  (9000 divided by 900) = 10

Beyond the fact that the ARS 3-Ring is almost three times as strong as its smaller counter-part, the importance of the mechanical advantage (MA) of the ARS 3-Ring will be apparent as well.

To understand the difference between “small” 3-Rings and the ARS 3-Ring we need to first understand how and why a 3-Ring works.

The 3-Ring system is a series of three mechanical actions, which progressively reduce the force. The first is a second-class lever. It occurs when the middle ring loops over the large O-Ring of the Heli-Bridle® (belly band) and is returned to a parallel relationship with the 3-Ring body. The middle ring becomes the lever and the base or first ring where it contacts the middle ring is the fulcrum. The pass through and return of the second ring through the first creates only a force direction change.

The reduction ratio of this step is simply the differential distance from the force load to the top and bottom of the ring. (This example is looking at the smaller 3-Ring designs) This ratio should be about 5 to 1.

The second step is the same as the first. It is a class 2 lever, and the force is applied to the lower portion (again hopefully) of the ring, with its retainer webbing acting as the fulcrum. The resultant force is again measured at the top of the ring. The third reduction is the retainer loop that holds the top of the ring. This is a simple pulley and always reduces the load by 50% or 2 to 1.

By beginning at the first reduction and multiplying each subsequent reduction to the product of the previous reduction we determine the total capability of the system. The first reduction is 5 to 1, the 2nd reduction is 3 to 1, the resultant advantage = 15 to 1. This 15 is then multiplied by the 3rd or next reduction, which is 2 to 1.  $2 \times 15 = 30$ : 1 MA for the smaller sized 3-Rings

The fact that the Air Rescue Systems rings are so much larger in diameter we can attain a higher ratio in the first and second step. The first is about 8 to 1, and the second is 5 to 1 ( $8 \times 5 = 40$ ). This 40 is then multiplied by the third or next reduction, which is 2 to 1 ( $2 \times 40 = 80$ ): 1 MA. This is a significant increase in release ability over the smaller 3-Ring's 30:1.

An example of the need for this increased MA would be during an inadvertent hang-up of an unloaded short haul line. Say just after inserting a short haul rescuer the empty line gets snagged

in a tree top, the pilot does not immediately observe the fouled line and forces applied build rapidly to 1200 lbs. The pilot goes to jettison the line and has to apply 15 lbs. of pull force on the handle to release the load using the larger ARS 3-Ring. If the smaller 30:1 MA 3-Ring were in place, the pull would have to be 40 lbs...you can see the problem. The ARS 3-Ring can release a load of 2400 lbs. with just a 30 lb pull.

The Air Rescue Systems 3-Ring Release is based on solid research and development and has been proven in the field through tens of thousands of live load flights. The 3-Ring Release system, the components, design and construction have set the standard by which all other systems are compared to. Safety is the overriding influence and consideration for all short haul operations. If you're not using the ARS Anchor and Release System with the ARS 3-Ring, your system is not as safe as it should be. Period.

**BIGGER IS BETTER.**



## **APPENDIX V**

### **AIR RESCUE SYSTEMS INSPECTION LOG**

Unit: \_\_\_\_\_ Agency: \_\_\_\_\_

In-Service Date: \_\_\_\_\_ Aircraft: \_\_\_\_\_

The Heli-Bridle PSD, should be inspected before and after each use. Heli-Bridles found to be damaged, excessively worn, or subjected to shock-loading forces must be removed from service immediately.

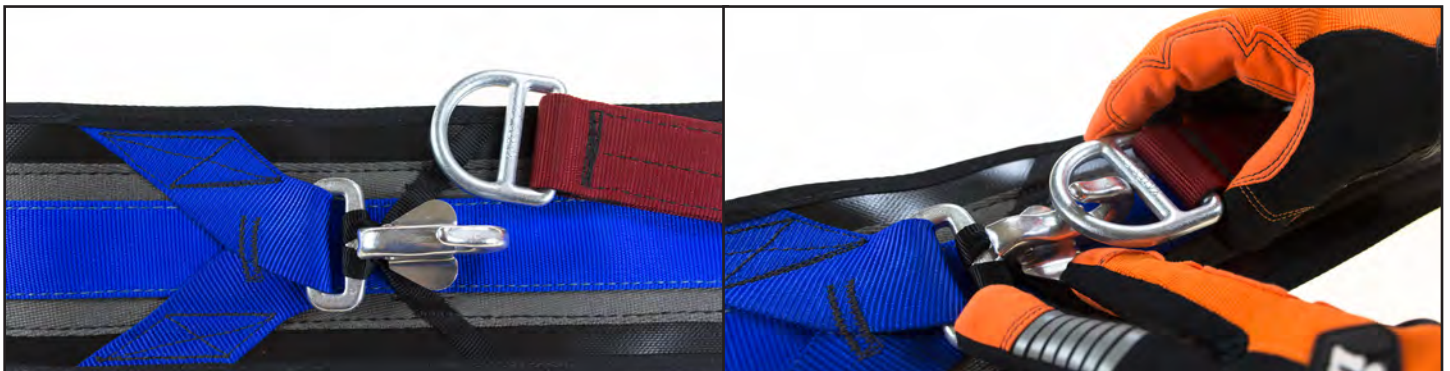
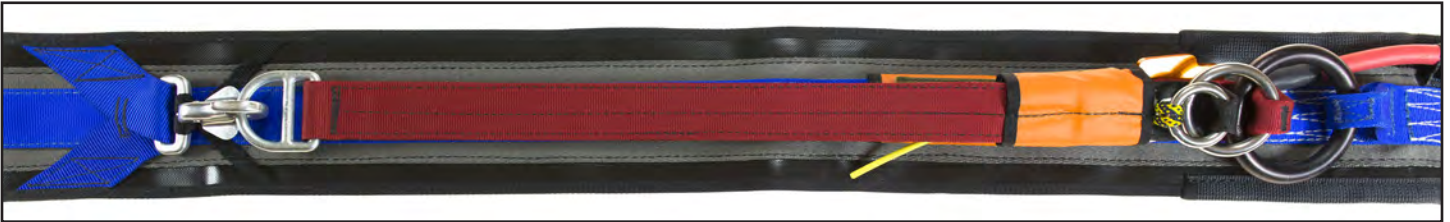
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## **APPENDIX VI**

### **HELI-BRIDLE PORTABLE SAFETY DEVICE**

# **3 RING KEEPER**

The purpose of the Heli-Bridle 3 Ring Keeper is to allow the user to switch back and forth, seamlessly, from HEC (Human External Cargo)/Short Haul operations, to Long Line operations without removing the Heli-Bridle PSD system.



1) When switching from HEC/Short Haul operations to Long Line operations remove the short haul line, 72 kN carabiner, and Hook Extension from the Heli-Bridle PSD system. This leaves the 3 Ring Release hanging below the aircraft.

2) Next, attach the open end of the 3 Ring Release to the modified clip or “keeper” attached to the body of the Heli-Bridle PSD.

NOTE: This 3 Ring Keeper does not work on helicopters that are equipped with hard point attachments. Only for use on helicopters using the incorporated bell band.

3) To switch from Long Line operations back to HEC/Short Haul operations remove the open end of the 3 Ring Release from the keeper and reattach as specified in the Heli-Bridle PSD manual.

AIR RESCUE SYSTEMS  
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